

Refractories: 2001

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SUMMARY OF FINDINGS. In 2001, total manufacturers' shipments of refractories amounted to \$1,907.3 million, a decrease of 8 percent, from \$2,063.7 million in 2000.

Shipments of clay refractories decreased 14 percent to \$756.8 million in 2001, from \$878.3 million in 2000. Clay refractories shipments accounted for 40 percent of total refractories shipments in 2001 and 43 percent in 2000.

Shipments of nonclay refractories decreased 3 percent to \$1,150.5 million in 2001, from \$1,185.4 million in 2000. Nonclay refractories shipments accounted for 60 percent of the total refractories shipments in 2001 and 57 percent in 2000.

Brick and shapes continue to be the dominate form of refractories. Brick and shapes from clay refractories showed a decrease of 12 percent to \$396.4 million in 2001, from \$451.8 million in 2000. Brick and shapes from nonclay refractories showed a decrease of 4 percent to \$607.8 million in 2001, from \$636.1 million in 2000. Unshaped clay refractories decreased 18 percent to \$296.8 million in 2001, from \$364.1 million in 2000. Mortars increased 9 percent to \$23.2 million in 2001, from \$21.3 million in 2000. Plastic refractories and ramming mixes from nonclay refractories increased 42 percent to \$165.4 million in 2001, from \$116.4 million in 2000.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Primary Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call John Linehan, 301-763-4742.

For mail or fax copies of this publication, please contact the Information Services Center, MCD, Washington, DC 20233-6900, or call 301-763-4673.

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Table 1. Value of Shipments of Refractories: 1991 to 2001
[Value in thousands of dollars]

Year	Total	Clay	Nonclay
2001.....	1,907,347	756,813	1,150,534
2000.....	2,063,680	878,310	1,185,370
1999.....	2,229,358	918,738	1,310,620
1998.....	2,380,480	1,023,210	1,357,270
1997.....	2,565,817	1,084,179	1,481,638
1996.....	2,340,757	930,006	1,410,751
1995.....	2,222,384	940,835	1,281,549
1994.....	2,046,979	906,165	1,140,814
1993.....	1,930,233	772,986	1,157,247
1992.....	1,956,083	786,078	1,170,005
1991.....	1,946,842	784,331	1,162,511

Table 2. Quantity and Value of Shipments of Refractories by Type: 2001 and 2000
[Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
2001						
327124	Clay and nonclay refractories.....	(X)	(X)	(X)	(X)	1,907,347
	Clay refractories.....	(X)	(X)	(X)	(X)	756,813
	Brick and shapes.....	(X)	788,762	715,106	238,106	396,449
3271240111	Fireclay, including semisilica, bloating and superduty fireclay brick and shapes, fireclay and high alumina pouring pit refractories; clay kiln furniture; radiant heater elelments; and other miscellaneous clay refractory shapes.....	23	399,230	361,949	107,451	137,069
3271240211	High alumina brick and shapes containing 50 percent alumina and over, including glass-house pots, tank blocks, feeder parts, and upper structure shapes, made predominantly of calcined bauxite, kyanite, and andalusite, and similar raw materials 1/.....	29	357,494	324,111	106,898	219,066
3271240411	Insulating brick and shapes.....	10	32,038	29,046	23,757	40,314
3271240421	Unshaped clay refractories.....	(X)	640,663	580,837	(X)	296,805
3271240421	Refractory bonding mortars, wet and dry, including clay and high alumina.....	33	(S)	(S)	(X)	44,451
3271240431	Plastic refractories and ramming mixes, less than 50 percent alumina; high alulmina plastic refractories and ramming mixes, 50 percent alumina and over; and high alumina phosphate bonded plastic refractories and ramming mixes, 50 percent alumina and over 2/.....	26	127,092	115,224	(X)	62,662
3271240311	Castable refractories less than 50 percent alumina; high alumina castables 50 percent and over; and insulating castables (hydraulic setting), density up to 105 pounds/cubic foot 3/.....	33	303,381	275,051	(X)	159,116
3271240441	Fireclay gunning mixes, including hydraulic setting gunning mixes, less than 50 percent alumina; high alumina gunning mixes, 50 percent alumina and over; and insulating gunning mixes (hydraulic setting).....	25	106,779	96,808	(X)	30,576
	Other refractory raw materials and refractory materials sold in lump or ground form, either for direct use by customer as a finished refractory product or as exported material.....	(X)	179,395	162,643	(X)	44,021
3271240451	Clay and high alumina refractory raw materials 4/.....	12	(D)	(D)	(X)	(D)
3271240461	Clay and high alumina refractory materials 5/.....	8	(D)	(D)	(X)	(D)
3271240000	Clay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	19,538
327125	Nonclay refractories.....	(X)	(X)	(X)	(X)	1,150,534
	Brick and shapes.....	(X)	418,804	379,695	89,642	607,840
3271250111	All silica brick and shapes, excluding semisilica.....	12	20,935	18,980	(S)	(S)
3271250121	Magnesite-carbon brick and shapes, both less than 7 percent carbon, 7 percent carbon and over, predominantly pitch and resin bonded, and carbon magnesite brick.....	4	81,182	73,601	13,918	35,396
3271250131	Magnesite brick and shapes, burned and unburned.....	8	(D)	(D)	(D)	(D)
3271250141	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick.....	4	(D)	(D)	(D)	(D)
3271250151	Silicon-carbide brick and shapes (made predominantly of silicon carbide), including kiln furniture.....	10	(D)	(D)	(D)	(D)
3271250161	Extra-high alumina brick and shapes containing 87.5 percent alumina and higher, and extra-high alumina pouring pit refractories, including sleeves, nozzles, runners, tuyeres, ladle gate parts, and mullite brick and shapes.....	24	22,120	20,054	6,665	92,081

Continued

Table 2. Quantity and Value of Shipments of Refractories by Type: 2001 and 2000
[Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
3271250171	Zircon and zirconia brick and shapes (made predominantly of either of these materials, including electrocast).....	17	13,860	12,566	4,228	102,311
3271250181	All other brick and shapes, including dolomite, dolomite-magnesite, forsterite, pyrophyllite-zircon, carbon and graphite crucibles, retorts, stopper heads, natural graphite, refractories, and molten cast.....	18	(D)	(D)	(D)	(D)
	Mortars.....	(X)	68,345	61,963	(X)	23,154
3271250211	Unshaped nonclay refractories basic bonding mortars made predominately of magnesite or chrome ore, dolomite, and other nonclay mortars (made predominantly of forsterite, zircon, and silica).....	8	(D)	(D)	(X)	(D)
3271250216	Extra-high alumina refractory mortars (made predominantly of fused or synthetic alumina and mullite).....	14	(D)	(D)	(X)	(D)
	Plastic refractories and ramming mixes.....	(X)	229,782	208,325	(X)	165,430
3271250221	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite.....	12	131,868	119,554	(X)	82,432
3271250226	Extra-high alumina plastic refractories and ramming mixes, 87.5 percent alumina and higher (made predominately of fused or synthetic aluminas and mullites), and extra-high alumina phosphate bonded plastic refractories and ramming mixes.....	15	47,400	42,974	(X)	46,381
3271250241	Extra-high alumina castables and gunning mixes.....	11	7,197	6,525	(X)	7,851
3271250236	Other nonclay plastic refractories and ramming mixes.....	7	(D)	(D)	(X)	(D)
3271250231	Other nonclay refractory castables and plastic refractories.....	9	(D)	(D)	(X)	(D)
3271250246	Gunning mixes: Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes.....	10	247,027	223,959	(X)	93,322
3271250251	Ceramic refractory fibers, 1,500 degrees F and higher.....	9	(D)	(D)	(D)	99,048
	Other nonclay refractory materials sold in lump or ground form, including ground silica.....	(X)	341,811	309,892	(X)	131,274
3271250256	Domestic shipments for direct use by customers as a finished refractory and all exported material 5/.....	15	149,501	135,540	(X)	72,388
3271250261	All other domestic shipments of nonclay refractory materials sold in lump or ground form as a refractory raw material 4/.....	7	192,310	174,352	(X)	58,886
3271250000	Nonclay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	30,466
327992	Dead-burned magnesia or magnesite.....	(X)	(D)	(D)	(X)	(D)
3279920331	Domestic shipments for direct use as finished refractory products and all exported material 5/.....	7	85,417	77,441	(X)	25,660
3279920336	All other domestic shipments predominantly for use as a refractory raw material.....	6	(D)	(D)	(X)	(D)
3274100311	Dead-burned dolomite.....	2	(D)	(D)	(X)	(D)

Continued

Table 2. Quantity and Value of Shipments of Refractories by Type: 2001 and 2000
[Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
2000						
	Clay and nonclay refractories.....	(X)	(X)	(X)	(X)	2,063,680
327124	Clay refractories.....	(X)	(X)	(X)	(X) r/	878,310
	Brick and shapes.....	(X)	868,970	787,824	268,369 r/	451,834
3271240111	Fireclay, including semisilica, bloating and superduty fireclay brick and shapes, fireclay and high alumina pouring pit refractories; clay kiln furniture; radiant heater elements; and other miscellaneous clay refractory shapes.....	25	421,277	381,937	112,930	152,520
3271240211	High alumina brick and shapes containing 50 percent alumina and over, including glass-house pots, tank blocks, feeder parts, and upper structure shapes, made predominantly of calcined bauxite, kyanite, and andalusite, and similar raw materials 1/.....	30	410,454	372,125	127,646 r/	254,474
3271240411	Insulating brick and shapes.....	10	37,239	33,762	27,793	44,840
	Unshaped clay refractories.....	(X)	745,329	675,729	(X)	364,061
3271240421	Refractory bonding mortars, wet and dry, including clay and high alumina.....	34	(S)	(S)	(X)	57,412
3271240431	Plastic refractories and ramming mixes, less than 50 percent alumina; high alumina plastic refractories and ramming mixes, 50 percent alumina and over; and high alumina phosphate bonded plastic refractories and ramming mixes, 50 percent alumina and over 2/.....	27	152,853	138,579	(X)	80,180
3271240311	Castable refractories less than 50 percent alumina; high alumina castables 50 percent and over; and insulating castables (hydraulic setting), density up to 105 pounds/cubic foot 3/.....	36	331,748	300,769	(X)	178,491
3271240441	Fireclay gunning mixes, including hydraulic setting gunning mixes, less than 50 percent alumina; high alumina gunning mixes, 50 percent alumina and over; and insulating gunning mixes (hydraulic setting).....	26	138,350	125,431	(X)	47,978
	Other refractory raw materials and refractory materials sold in lump or ground form, either for direct use by customer as a finished refractory product or as exported material.....	(X) r/	177,773 r/	161,172	(X) r/	39,741
3271240451	Clay and high alumina refractory raw materials 4/.....	13	(D)	(D)	(X)	(D)
3271240461	Clay and high alumina refractory materials 5/.....	9	(D)	(D)	(X)	(D)
3271240000	Clay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	22,674
327125	Nonclay refractories.....	(X)	(X)	(X)	(X)	1,185,370
	Brick and shapes.....	(X)	405,778	367,886 r/	96,638	636,074
3271250111	All silica brick and shapes, excluding semisilica.....	13	19,825	17,974	(S)	(S)
3271250121	Magnesite-carbon brick and shapes, both less than 7 percent carbon, 7 percent carbon and over, predominantly pitch and resin bonded, and carbon magnesite brick.....	6	62,360	56,537	11,385	62,507
3271250131	Magnesite brick and shapes, burned and unburned.....	9	(D)	(D)	(D)	(D)
3271250141	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick.....	5	(D)	(D)	(D)	(D)
3271250151	Silicon-carbide brick and shapes (made predominantly of silicon carbide), including kiln furniture.....	10	(D)	(D)	(D)	(D)
3271250161	Extra-high alumina brick and shapes containing 87.5 percent alumina and higher, and extra-high alumina pouring pit refractories, including sleeves, nozzles, runners, tuyeres, ladle gate parts, and mullite brick and shapes.....	25 r/	27,268 r/	24,722	8,245	95,561
3271250171	Zircon and zirconia brick and shapes (made predominantly of either of these materials, including electrocast).....	16 r/	13,791 r/	12,503	6,583 r/	101,579

Continued

Table 2. Quantity and Value of Shipments of Refractories by Type: 2001 and 2000
[Value in thousands of dollars]

Product code	Product description	No. of cos.	Quantity shipped (unit of measure)		M bricks (1,000 9-inch equivalent)	Value of shipments
			Short tons	Metric tons		
3271250181	All other brick and shapes, including dolomite, dolomite-magnesite, forsterite, pyrophyllite-zircon, carbon and graphite crucibles, retorts, stopper heads, natural graphite, refractories, and molten cast.....	17	(D)	(D)	(D)	(D)
	Mortars.....	(X)	67,488	61,186	(X)	21,344
3271250211	Unshaped nonclay refractories basic bonding mortars made predominately of magnesite or chrome ore, dolomite, and other nonclay mortars (made predominantly of forsterite, zircon, and silica).....	8	(D)	(D)	(X)	(D)
3271250216	Extra-high alumina refractory mortars (made predominantly of fused or synthetic alumina and mullite).....	15	(D)	(D)	(X)	(D)
	Plastic refractories and ramming mixes.....	(X) r/	185,880 r/	168,522	(X) r/	116,427
3271250221	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite.....	12 r/	91,592 r/	83,039	(X) r/	30,367
3271250226	Extra-high alumina plastic refractories and ramming mixes, 87.5 percent alumina and higher (made predominately of fused or synthetic aluminas and mullites), and extra-high alumina phosphate bonded plastic refractories and ramming mixes.....	15	48,440	43,917	(X)	50,561
3271250241	Extra-high alumina castables and gunning mixes.....	10	8,844	8,018	(X)	10,150
3271250236	Other nonclay plastic refractories and ramming mixes.....	9	(D)	(D)	(X)	(D)
3271250231	Other nonclay refractory castables and plastic refractories.....	9	(D)	(D)	(X)	(D)
	Gunning mixes:					
3271250246	Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes.....	13 r/	259,409 r/	235,185	(X) r/	95,319
3271250251	Ceramic refractory fibers, 1,500 degrees F and higher.....	10 r/	42,627 r/	38,646	11,542 r/	122,832
	Other nonclay refractory materials sold in lump or ground form, including ground silica.....	(X)	412,209	373,716	(X)	161,184
3271250256	Domestic shipments for direct use by customers as a finished refractory and all exported material 5/.....	16	172,055	155,988	(X)	85,147
3271250261	All other domestic shipments of nonclay refractory materials sold in lump or ground form as a refractory raw material 4/.....	8	240,154	217,728	(X)	76,037
3271250000	Nonclay refractories, n.s.k. 6/.....	(X)	(X)	(X)	(X)	32,515
327992	Dead-burned magnesia or magnesite.....	(X)	(D)	(D)	(X)	(D)
3279920331	Domestic shipments for direct use as finished refractory products and all exported material 5/.....	6	(D)	(D)	(X)	(D)
3279920336	All other domestic shipments predominantly for use as a refractory raw material.....	7	(D)	(D)	(X)	(D)
3274100311	Dead-burned dolomite.....	2	(D)	(D)	(X)	(D)

D Withheld to avoid disclosing data for individual companies. n.s.k. Not specified by kind. r/Revised by 5 percent or more from previously published data. S Does not meet publication standards. X Not applicable.

1/Includes high alumina pouring pit refractories (containing 50 percent alumina and over), sleeves, nozzles, runners, and ladle gate parts. Excludes data for mullite and extra-high alumina refractories. These products are included in nonclay refractories section.

2/Includes products referred to as plastic firebrick and less plastic materials intended for ramming into place after addition of water (when shipped in dry form).

3/Includes hydraulic setting castables designed for low thermal conductivity and having bulk densities as defined in ASTM classification C-401, not greater than 105 pounds/cubic foot.

4/Includes shipments to refractory producers for reprocessing in manufacture of brick and other refractories.

5/Includes shipments for direct use as finished refractory products by establishments classified in manufacturing industries and excludes shipments to refractory producers for reprocessing in manufacture of brick and other refractories. Includes all exports.

6/Not specified by kind (n.s.k.) represents value of shipments for establishments that did not report detailed information and establishments, typically with less than five employees that were not included on MA327C mailing panel.

Table 3. Value of Shipments, Exports, Imports, and Apparent Consumption of Refractories by Type: 2001 and 2000
[Value in thousands of dollars]

Product code 1/	Product description	Manu- facturers' shipments	Exports of domestic mer- chandise 1/ 2/ (value at port)	Percent exports to manu- facturers' shipments	Imports for consump- tion 1/ 3/ (value at port 4/	Apparent consump- tion 5/	Percent imports to apparent consumption
2001							
	Clay and nonclay refractories 6/.....	1,669,746	322,072	19.3	234,008	1,581,682	14.8
	Clay refractories.....	693,254	52,422	7.6	44,909	685,741	6.5
3271240111, 211, 411	Brick and shapes.....	396,449	39,297	9.9	43,820	400,972	10.9
3271240311, 421, 431, 441	Unshaped refractories and gunning mixes.....	296,805	13,125	4.4	1,089	284,769	0.4
	Nonclay refractories.....	976,492	269,650	27.6	189,099	895,941	21.1
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	149,330	62,320	45.5	84,536	159,244	53.1
3271250111, 151, 161, 171, 181	All other brick and shapes.....	458,510	110,531	24.1	87,020	434,999	20.0
3271250211, 216, 221, 226, 231, 236, 241, 246, 251	Unshaped nonclay refractories and gunning mixes.....	380,954	96,799	25.4	17,543	301,698	5.8
2000							
	Clay and nonclay refractories 6/.....	1,838,161	353,659	19.2	417,561	1,902,063	22.0
	Clay refractories.....	815,895	69,765	8.6	203,012	949,142	21.4
3271240111, 211, 411	Brick and shapes.....	451,834	52,082	11.5	201,155	600,907	33.5
3271240311, 421, 431, 441	Unshaped refractories and gunning mixes.....	364,061	17,683	4.9	1,857	348,235	0.5
	Nonclay refractories.....	1,022,266	283,894	27.8	214,549	952,921	22.5
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes and chrome brick.....	164,139	56,167	34.2	83,967	191,939	43.7
3271250111, 151, 161, 171, 181	All other brick and shapes.....	471,935	119,048	25.2	100,796	453,683	22.2
3271250211, 216, 221, 226, 231, 236, 241, 246, 251	Unshaped nonclay refractories and gunning mixes.....	355,922	108,679	28.1	29,786	307,299	9.7

1/For comparison of North American Industry Classification System (NAICS)-based product codes with Schedule B export codes, and HTSUSA import codes, see Table 4.

2/Source: Census Bureau report EM 545, U.S. Exports.

3/Source: Census Bureau report IM 146, U.S. Imports for Consumption and General Imports.

4/"Value at port" includes both import value and duty value.

5/Apparent consumption is derived by subtracting exports from total of shipments plus imports (including duty).

6/"Clay and nonclay refractories" total shown here excludes product codes 3271240451, 3271240461, 3271240000, 3271250256, 3271250261, 3271250000, 3279920331, 3279920336, and 3274100311; therefore, they differ from the totals shown in Tables 1 and 2a.

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code 1/	Import code 2/
3271240111, 211, 411	Clay brick and shapes.....	6902.20.1010 6902.20.5010 6902.90.1010 6902.90.5010 6903.90.0010	6902.20.1010 6902.20.5010 6902.90.1010 6902.90.5010 6903.90.0010
3271240311, 421, 431, 441	Unshaped clay refractories and gunning mixes.....	3816.00.0010	3816.00.0010
3271250121, 131, 141	Nonclay magnesite and magnesite-chrome brick and shapes, and chrome brick	6902.10.1000 6902.10.5000	6902.10.1000 6902.10.5000
3271250111, 151, 161, 171, 181	All other nonclay brick and shapes.....	6902.20.5020 6902.90.1020 6902.90.5020 6903.90.0050	6902.20.5020 6902.90.1020 6902.90.5020 6903.90.0050
3271250211, 216, 221, 226, 231, 236, 241, 246, 251	Unshaped nonclay refractories and gunning mixes.....	3816.00.0050	3816.00.0050

1/Source: 2001 edition, Harmonized System-based Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.

2/Source: Harmonized Tariff Schedule of the United States, Annotated (2001).

Appendix.

General CIR Survey Information, Explanation of General Terms and Historical Note

GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)

The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or footnoted. The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

EXPLANATION OF GENERAL TERMS

Capacity. The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

Consumption. Materials used in producing or processing a product or otherwise removing the product from the inventory.

Exports. Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

Gross shipments. The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

Interplant transfers. Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

Inventories. The quantity or value of finished goods, work in progress, and materials on hand.

Machinery in place. The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

Net receipts. Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

Production. The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

Quantities produced and consumed. Quantities of each type of product produced by a company for internal consumption within that same company.

Quantity and value of new orders. The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

Quantity and value of shipments. The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and

returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Stocks. Total quantity of ending finished inventory.

Unfilled orders (backlog). Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

HISTORICAL NOTE

Data on refractories have been collected by the Census Bureau since 1947. Historical data may be obtained from Current Industrial Reports (called Facts for Industry before 1959) available at your local Federal Depository Library.